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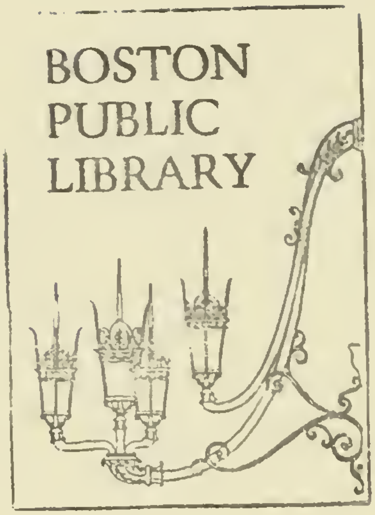

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Proposal to

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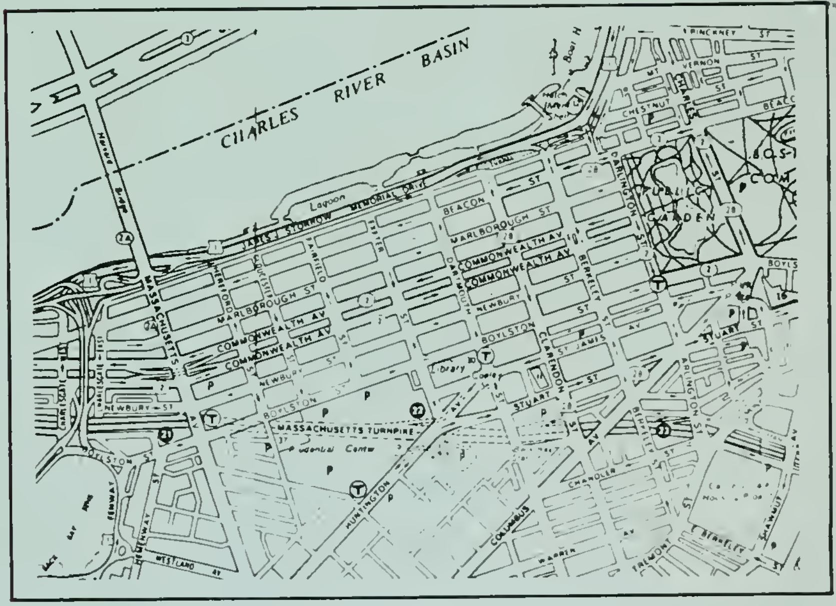
Back Bay Transportation Study



TAMS/ Tippetts-Abbett-McCarthy-Stratton

Engineers, Architects, and Planners

May 1985

TAMS
TIPPETTS-ABBETT-McCARTHY-STRATTON
ENGINEERS, ARCHITECTS AND PLANNERS

PARTNERS
Wilson V. Binger, P.E.
Raymond J. Hodge, P.E.
Austin E. Brant, Jr., P.E.
John E. Bardes, P.E.
Robert F. Heins, P.E.
Dana E. Low, P.E.
Eugene O'Brien, P.E.
Donald R. Peirce, R.A.
Patrick J. McAward, Jr., P.E.
Philip Perdichizzi, P.E.
Lyle H. Hixenbaugh, P.E.
Edward C. Regan, P.E.
Mario Asin, P.E.

NEW ENGLAND REGIONAL MANAGER, Bruce Campbell, P.E.
Sarsfield P. Brennan, Jr., P.E.
Richard D. Tilles, P.E., A.I.C.P.
Ronald H. Axelrod, R.A.
John J. Aherne, P.E.
Gultekin Sultan, P.E.
Georgy Bezkorovainy, P.E.
Chris Iwerks, R.A.
Thomas F. Saunders, R.A.
Deleep K. Hazra, P.E.
Deborah J. Rivers, R.A., A.I.A.
Michael T. Gruenbaum, P.E.

May 6, 1985

Commissioner Lisa G. Chapnick
Traffic and Parking Department
City Hall, 7th floor
Boston, Massachusetts 02201

Dear Commissioner Chapnick:

TAMS/Tippetts-Abbett-McCarthy-Stratton is pleased to submit its qualifications for this Back Bay Transportation Study. The Back Bay area is being considered for a number of major developments, and the City wishes to document the base case condition to which all new proposals can be related. In addition, the study is to define current or pending problem areas and make recommendations to be followed in review of new proposals.

We believe TAMS is uniquely qualified to perform these services because of our familiarity with the City of Boston and the Back Bay area in particular. The designated Project Manager has been practicing transportation engineering in the Boston area since the 1950's, and TAMS has completed a number of projects in the City of Boston since the 1970's. In the Back Bay area we completed the Massachusetts Avenue computerized traffic control system project and collected extensive private and public transportation data during the conduct of the 1982 Boston Cordon Count and the Boston Central Artery Origin/Destination Study. Three of the designated staff members have worked on these studies. We have also been involved in a number of Boston projects involving community participation—the one element requiring considerable attention in this study.

Your Request for Proposal authorizes an expenditure of up to $20,000 for this study. TAMS is prepared to do the required work for this amount, provided that some data collection and other specified tasks are to be performed by the City.

We look forward to the challenge of assisting the City of Boston with this project.

Very truly yours,

TAMS/Tippetts-Abbett-McCarthy-Stratton

Bruce Campbell
Bruce Campbell

38 CHAUNCY STREET, BOSTON, MASSACHUSETTS 02111 • TELEPHONE (617) 482-4835

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Project Approach

PROJECT APPROACH

The Transportation and Traffic Engineering Study of Back Bay Request for Proposals (RFP) contains the following elements:

- Establishment of a base case condition,
- Identification of current or pending problems areas, and
- Setting of strategies to be followed in the review of new proposals.

The catalyst for this Back Bay study is a proposed development by a Joint Venture of New England Mutual Life Insurance Company and G.D. Hines Interests, Inc. in the vicinity of the City-owned St. James Avenue Garage site. This proposed development was approved, subject to certain terms and conditions, including the following:

- aim to reduce traffic levels on Berkeley Street
- work towards the overall reduction in the level of traffic in the area by 1987
- improve vehicular access to the expressway.

Our approach has been to divide the scope of work into three major tasks:

Task I Preparation of 1985 Data Base

The end product of this task is a compilation of maps, charts, tables and descriptive procedures which form a 1985 data base.

Task II Recommendations

Under this major task heading we would identify current or pending problem areas, prepare recommendations on the three conditions related to the New England Life proposed development and make other recommendations relative to traffic problems in the Back Bay area.

Task III 1987-1988 Status Evaluation

We will discuss the traffic impacts of the proposed New England Life development and make recommendations related to other future developments in the Back Bay area.

We recognize the need for an active community participation effort in this project and we see the Working Committee as the vehicle in which this can be accomplished. Utilizing a Working Committee and input from citizens from the Back Bay area, local problems could be more readily identified and practical solutions achieved.

We recognize the need to perform this study in a short time frame. Accordingly, our Principal Investigator would be able to devote up to 100% of his time for this project by substituting other personnel for his current assignments. The support staff would also be able to devote the necessary time to complete this project in the 3-month period.

All of the staff members assisted to this project are familiar with the Back Bay area through involvement in other studies:

Project Manager-	Studies in the 50's and 60's with Bruce Campbell & Associates
Principal Investigator -	1982 Boston Cordon Count
Community Participation -	Replacement Transit Improvement Study
Traffic Engineer	Massachusetts Avenue Computerized Traffic Control System Boston Central Artery O/D Survey 1982 Boston Cordon Count
Civil Engineer -	Replacement Transit Improvement Study
Engineer -	Boston Central Artery O/D Survey

SCOPE OF SERVICES

TASK I PREPARATION OF 1985 DATA BASE

The end product of this task is a compilation of maps, charts, tables, and descriptive procedures which form a 1985 data base. These documents will form a basis for analyzing future land use changes and proposals in Back Bay.

Task A Collection of Traffic Volume Data

1. The City will supply us with 1985 24-hour volume counts for most links. Manual intersection counts will also be taken by the City at a number of locations. No counts will be taken by TAMS.

2. From the data supplied by the City, we will prepare a 1985 average weekday traffic flow map for the study area. We will also prepare a "balanced" PM peak hour map for the same network. (Alternatively, we could supply an AM peak hour map for the entire study area or for certain links.)

Task B Level of Service Analysis

1. We will perform level of service analysis for each link in the study area. Level of service analysis for intersections will be performed by the City using either the Highway Capacity Manual method or the TRC 212 method. We will plot the City's data on a joint level of service map.

2. Most of the Back Bay signalized intersections are interconnected and operate in a 3-dial pre-timed system. The City will supply us with the timing plans and any available time-space diagrams. Queue lengths will be determined from available traffic volume data and timing plans for up to 10 critical intersections.

Task C Inventory of Existing Conditions

We will prepare a map showing the following existing conditions which affect traffic operations:

- curb parking regulations
- lane use configurations
- traffic control devices
- existing driveways and access points
- off-street parking locations.

Task D Inventory of Existing Traffic Generators

1. The City will supply a land-use map of the study area which will locate all existing traffic generators, their characteristics and square footages. Using Institute of Transportation Engineers trip generation tables, we will estimate the number of vehicular trips generated by each generator during an average week-day and the PM peak. Data will be summarized by blocks.

2. The existing conditions summary will locate all parking garages and off-street lots. The City will supply us traffic counts at principal driveways and access points.

Task E Accident Summaries

The City will make available accident data for a 3-year period. We will summarize the data by link or intersection and plot the accidents for a one-year period on a study area map.

Task F Analysis of Historic Trends

1. The 1985 traffic flow data will be compared with pre-1980 (1970-1979) study area traffic counts and annual growth rates (by link) will be calculated.

2. An historic trend analysis of parking policies from 1975-85 will be made.

3. An historic trend analysis of parking supply and demand from 1975-85 will be made from available information.

Task G Future Traffic Trends Prediction

Future traffic trends in the Back Bay area will be affected by the following factors:

- increase in land use intensity and development
- increase in through traffic
- change in parking policies
- change in mode split.

We will a perform qualitative analysis of these factors to determine how prediction of future traffic trends would be affected.

Task H Pedestrians

Pedestrian movements for portions of Back Bay are available in the 1982 Boston Cordon Count. We will supplement this with any other pedestrian counts available in the City's files. We will work with the City in preparing a program for collecting useful pedestrian data to complete a pedestrian flow map for the study area.

Task J Air Quality Analysis

TAMS has a computer program for evaluating air quality conditions at intersections. Input data consist of:

- number of vehicles entering an intersection
- total vehicle delay at an intersection.

Output data would be expressed in grams per minute per vehicle of:

- hydrocarbons (HC)
- carbon monoxide (CO)
- nitrates (NO_x)

Traffic volume data would be compiled in Task I-A, and vehicle delay estimates from the level of service analysis (Task I-B). We will calculate air quality at 10 intersections for existing conditions (1985).

Task K Other Transportation Modes

The 1982 Boston Cordon Count contains considerable data on public transportation in the study area. Its data base includes surveys at:

- Back Bay commuter rail station
- Express bus loading area at Copley Square
- Auditorium and Symphony stations on the green line.

We will assemble public transportation sector data from other sources and compile a 1985 inventory of such uses.

Task L Movement of Goods

We will assemble all available data on the movement of goods and perform a qualitative analysis for 1985.

Task M Working Committee Meetings

We anticipate three Working Committee meetings during the conduct of Task I. Meeting minutes will be taken by the City.

TASK II RECOMMENDATIONS

The following tasks detail an analysis of specific and general problem areas that we will undertake, and a series of recommendations that we will propose for Back Bay.

Task A Definition of Specific and General Problem Areas

The following specific tasks have been identified in the RFP:

1. Aim to reduce traffic levels on Berkeley Street

   We will investigate a number of options and perform traffic re-assignments where feasible and qualitative analyses where not.

2. Work towards overall reduction in the level of traffic in the area by 1987

   Some of the elements that we will evaluate are improved public transportation facilities and improved major arterials on the periphery of the study area.

3. Improved vehicular access to the Southeast Expressway and the Central Artery

   We will evaluate a number of TAMS alternatives and suggestions made by others.

4. Other problem areas

   We will address a number of other problem areas in Back Bay and perform analysis of mitigating measures which might be applied.

Task B Recommendations of Short-Term Remedial Actions

Following the completion of Task II-A, we will prepare a list of recommendations which might be reasonably implemented within a period of one year or less.

Task C Recommendations of Medium-Range Remedial Actions

Drawing upon the list prepared in Task II-A, we will list a number of recommendations that might reasonably be implemented within a time period of one to three years. These recommendations would also, most likely, carry a cost higher than the Task II-B proposals.

Task D Recommendations of Long-Term Remedial Actions

We will compile a list of long-term recommendations for improving public and private transportation in Back Bay. Most of these recommendations will require an early initiation of planning and design work.

Task E Working Committee Meetings

We anticipate four Working Committee meetings and one public meeting during the conduct of Task II. Meeting minutes will be taken by the City.

TASK III 1987-1988 STATUS EVALUATION

Recently, a proposal was made for the City by the joint venture of New England Life Insurance Company and G.D. Hines Interests, Inc. for the redevelopment of the area in the vicinity of St. James Avenue Garage. We will discuss the traffic impacts of this development and make recommendations relating to transportation strategies to be adopted by the City in implementing future development proposals.

Task A Traffic Impacts of New England Life Proposed Development

1. The City will supply us with the development's location, square footage and parking requirements. We will discuss the likely impacts of this development on the Back Bay neighborhood.

2. We will also discuss the likely impacts of the proposed development by New England Life under changes proposed in Task II.

Task B Recommendations for Future Development Proposals

We will make recommendations relating to transportation strategies to be adopted by the City in implementing further development proposals.

Task C Working Committee Meetings

We anticipate that no Working Committee meeting will be required for Task III.

Qualifications

FIRM QUALIFICATIONS

Boston Projects

TAMS has completed a number of transportation and traffic engineering projects in the City of Boston, three of which included work in the Back Bay area of Boston. In 1975 TAMS completed design on the Massachusetts Avenue computerized traffic control system. More than one-half of the signalized intersections on this system are in the Back Bay area. In 1982 TAMS conducted the Boston Cordon Count, and many of the survey stations lay in the Back Bay area along Massachusetts Avenue. The cordon count included not only the movement of vehicles, trucks, pedestrians and bicycles but also consisted of public transportation studies at the Back Bay commuter rail station and two Green Line stations. Vehicle occupancy counts were taken at all streets crossing Massachusetts Avenue in the Back Bay, including the Massachusetts Turnpike and Storrow Drive. The 1977 Central Artery Orgin/Destination Study extended to the Back Bay area and included six survey stations.

TAMS Principal Investigator was in charge of the data collections phase in the Back Bay during the cordon count in 1982 and the Senior Transportation Engineer has had major responsibilities in the cordon count, the testing of the Massachusetts Avenue computerized signal system and the Central Artery Survey.

Other Boston studies conducted by TAMS which have led to a complete understanding of the City's and region's basic traffic problems are:

Downtown Crossing Design (Auto Restricted Zone)
Southwest Corridor Replacement Transit
Commonwealth Avenue Redesign
TOPICS Program for Boston involving the following projects:

- Roxbury - Jamaica Plain
- Downtown
- South Boston
- East Boston
- Charlestown

These projects have resulted in constant contact with virtually all of Boston's leading traffic and transportation officials, as well as many neighborhood groups. The Replacement Transit Study alone has involved a dozen neighborhood groups from Chinatown to Dudley Square.

Other Related Projects

Attached are some project description sheets of recent projects relevant to the experience required for the Back Bay area study and neighborhood concerns. They include:

Logan Airport Traffic Experiment
Boston Central Artery Reconstruction
Boston State Hospital Site Traffic Impact Study
Framingham - Natick Area Transportation Study
Heritage State Park Traffic Impact Study
Neponset Street Traffic Study
Hotel Complex Traffic Impact Study
Transportation Study for General Electric
Light Rail Studies
Harbor Campus Access Road, University of Massachusetts

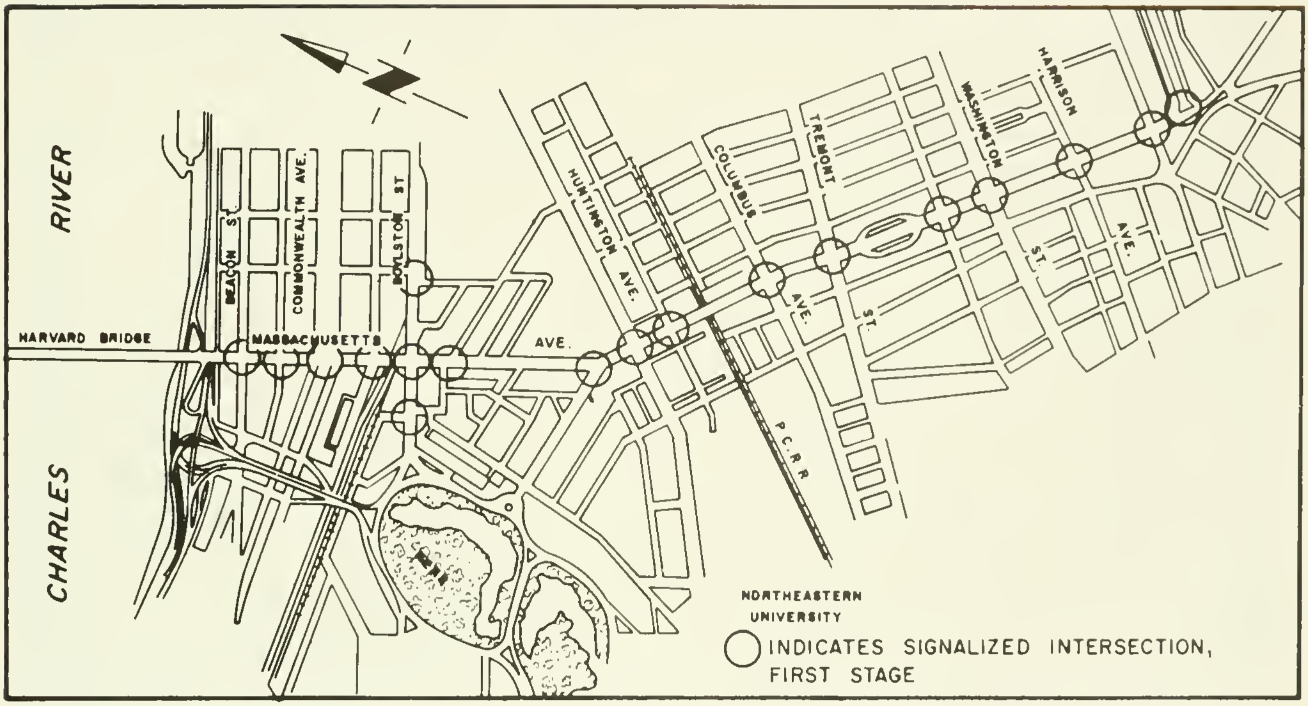
COMPLETED TOPICS & URBAN SYSTEMS PROJECTS IN MASSACHUSETTS

Functional Design, Plans, Specifications, Estimates and Construction Inspection by TAMS

Community	Project Value	No. of Intersections Total	No. of Intersections Signals	Type of Control	Interconnection	Pre-emption	Roadway Reconstruction	Channelization & Geometric Improvements	Drainage	Features of Interest
Attleborough	$ 29,000	1	1	Actuated	–	–	–	–	–	Actuated signal system
Boston Mass Ave	1,620,000	18	18	Computer System	•		•	•	–	Minor geometric changes, left turn slots, park reconstruction, landscaping, street lighting, bus priority
Boston 6 Intersect	97,000	6	6	Pre timed & Actuated			–	•	–	Pedestrian crossing at transit station
Braintree	57,000	1	1	Actuated		RR	•	•	–	Minor roadside and curb work
Brockton Bridges	312,000					–	•	–	•	Construction of two bridges, utility betterments
Brockton 3 Locations	462,000	3	3	Actuated	•	Queue & Fire	•	•	•	New street construction, sewage & drainage system improvements, roadway widening, water line replacement, signals with queue and fire pre-emption
Brockton, Downtown Circulation	Force Account	45	10				–	•	–	Revise downtown circulation, signing and pavement markings
Brookline Mountfort & St Mary	41,000	1	1	Pre timed	•		•	–	–	Roadway widening, signal interconnected to existing pre-timed system
Brookline Beacon Street	196,000	5	5	Pre timed	•	–	–	•	–	Trolley car signals, transit passenger shelters
Burlington Rt 128 Lighting	1,452,000					–	–	–	–	Installation of complete highway lighting system with interchange towers and lighting standards
Cambridge	193,000	9	9	Pre timed	•	Fire	–	–	–	Pre-timed system
Dedham	174 000	3	3	Actuated	•	–	•	•	–	Two fully actuated intersections interconnected, roadway widening and major reconstruction
Dorchester	1,389,000	13	11	Actuated	•	Bus	•	•	•	Major reconstruction of roadway, actuated system, bus priority, queue detection
Fall River	102,000	6	6	Traffic Respon System	•	–	–	–	–	New master controller
Framingham	589 000	2	2	Actuated	•	–	•	•	•	Roadway widening and new bridge structure
Leominster	475,000	6	5	Actuated		Fire & RR	•	•	•	Major intersectional geometric changes, park benches and landscaping, widening and changes in vertical alignment
Lynn Broad Lewis & New Ocean	499 000	13	11	Pre timed & Actuated	•		•	•	–	Minor roadside control & extensive island construction, 2 systems with unified master controller
Lynn Downtown	Force Account	8	0	None			–	•	–	Channelization
Malden	565,000	10	10	Computer System	•	Fire & RR	•	•	–	New unified police control center
Melrose	44,000	2	2	Actuated		–	–	•	–	Manual control for school crossing guard
Methuen East Street	44,000	2	1	Actuated			•	•	–	Minor roadside control & sidewalk construction
Methuen 4 Intersect	273 000	4	4	Pre timed	•	–	•	•	•	Traffic responsive pre-timed system, major roadway widening and intersection geometry changes
Milton	59 000	5	2	Pre timed & Actuated		–	•	•	–	Minor widening and intersection delineation
Needham	59,000	3	1	Pre timed & Actuated	•	RR	–	–	–	Innovative RR crossing protection on May Street
North Attleborough	323,000	5	2	Actuated	•	–	•	•	•	Demolition of two bridges, roadway realignment & reconstruction, drainage improvements, landscaping & signalization
Peabody Lowell St	884,000	5	3	Actuated		–	•	•	•	Total roadway reconstruction, sanitary sewer betterments, retaining walls
Peabody Wilson Sq	157,000	2	2	Actuated		Fire	•	•	•	Total roadway reconstruction, roadway widening and reconstruction, retaining wall, new geometry, circulation changes
Quincy 9 Intersections	202,000	9	9	Pre timed & Actuated	•	–	–	•	–	Pre-timed interconnected
Quincy Southern Artery	857,000	10	10	Pre timed & Actuated	•	Fire & Emrg.	•	•	•	Installation of optical pre-emption for fire & emergency vehicles, semi-actuated coordinated signal system, roadway reconstruction, drainage improvements, channelization and geometric improvements
Quincy Upland Rd	109,000	3	0	None	–	–	•	•	•	Total roadway reconstruction – retaining walls, drainage, water system changes
Reading	53,000	1	1	Actuated	•	RR	–	•	•	Curb installation, rubberized RR crossing, fully actuated signals
Seekonk	121,000	2	2	Actuated	–	–	•	•	–	Reconstruction and minor widening
Somerset 11 Locations	616,000	12	9	Actuated	–	–	•	•	•	Installation of delay timer detector placement configuration for high speed roadways, channelization and geometric improvement
South Boston	244,000	13	12	Pre timed & Actuated	•	–	–	•	–	Pre-timed system and new master controller adapted to computer takeover
Swampscott	67,000	4	1	Actuated	–	–	•	•	–	Mostly landscaping of abandoned railroad crossing, removal of abutments
Taunton – 3RR Crossings	71,000	3	1	Actuated		RR	•	–	–	Minor roadway work & sidewalk construction
Taunton – 4 Intersections	108,000	4	4	Actuated	–	RR	–	•	–	Minor corner roundings
Wakefield	67,000	2	2	Actuated	•	RR	•	•	–	Two fully-actuated interconnected intersections, roadway widening
Wakefield 1 Location	108,000	1	1	Actuated		RR	•	•	•	Roadway and ramp construction, installation of street light, rubberized RR crossing, geometric improvements, landscaping, exclusive left turn lane
Waltham	257,000	3	3	Actuated		Fire	•	•	•	Intersection reconstruction, new geometry, minor landscaping
Waltham – 1 Location	36,000	1	1	Actuated	–	–	–	–	–	Semi-actuated traffic signals
Weymouth	116,000	2	1	Actuated		Fire	•	•	•	Major reconstruction of one intersection, cul-de-sac, widening
Winchester	180,000	4	4	Actuated		–	•	•	•	Widening of length of roadway with total reconstruction
Woburn 11 Locations	979 000	17	15	Actuated & traffic responsive	•	Fire	•	•	•	Three separate systems, fully-actuated coordinated, semi actuated coordinated, and traffic responsive with sampling detectors Major channelization & geometric improvements
TOTALS	$14,358 000	269	192							

TOPICS PROJECTS

Commonwealth of Massachusetts



TAMS has provided TOPICS planning and design services for most eastern Massachusetts cities and towns. The projects ranged from minor signing improvements to major roadway and bridge construction along arterial streets. TAMS' work has involved preparation of Areawide TOPICS Plans for over 150 communities, more than 75 Functional Design Reports covering in excess of 600 intersections, and final detailed plans, specifications and estimates for approximately 50 projects. TAMS also provided inspection services to insure that traffic signal equipment installation and function were as required.

Client: Massachusetts Department of Public Works

Services: Feasibility studies, preliminary plans and final designs, specifications and estimates, environmental impact analyses.

TAMS

1982 BOSTON CORDON COUNT

Boston, Massachusetts

Approximately every ten years, the City of Boston, Massachusetts conducts a Cordon Count of all vehicles and persons entering the downtown area by public and private transportation. The 1982 Cordon Count was conducted by TAMS using a total of 128 survey persons to count and classify all vehicles and pedestrians on the streets; to count people in cars, trucks, and buses; and to count people in transit vehicles at rapid transit stations, express bus locations and railroad stations.

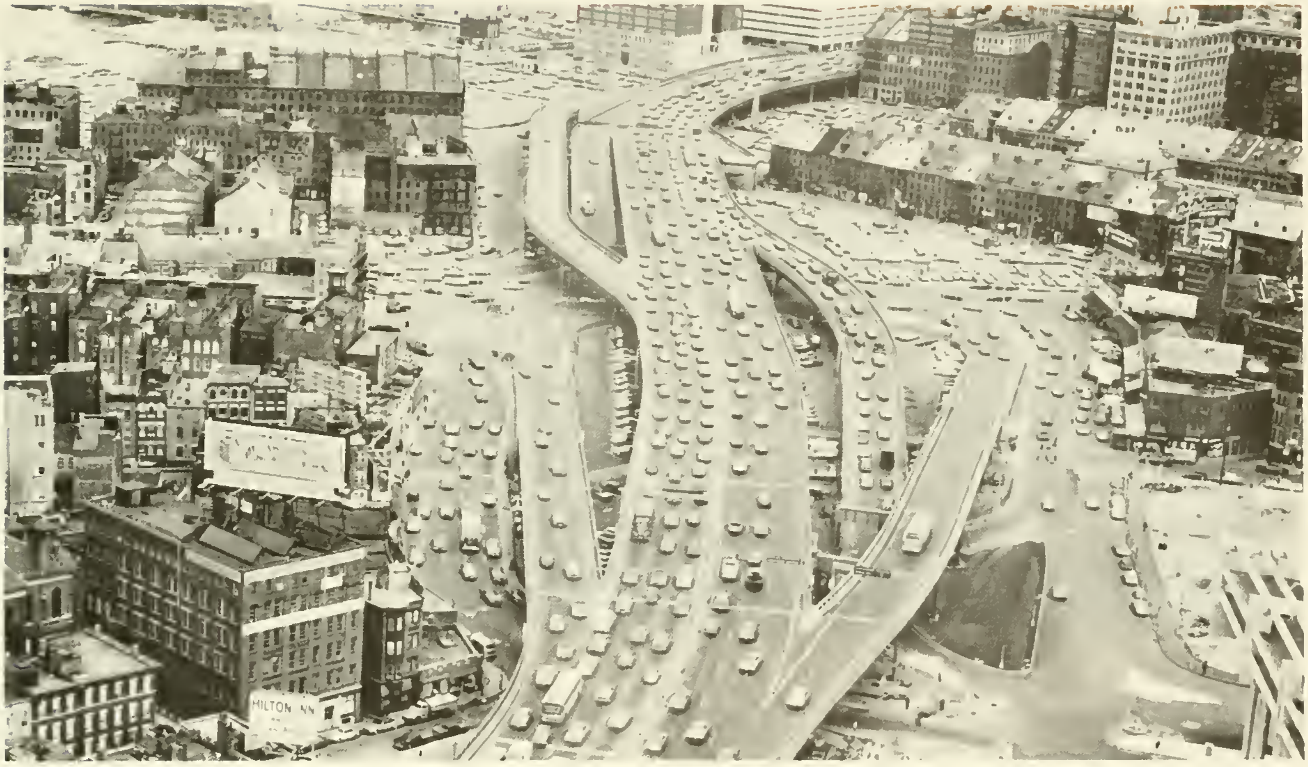
Person crossings via public transportation increased for the first time in many years to a level not seen since the 1960's. Two of the modes were responsible for the turnaround: buses and commuter rail. Both modes showed a signficant increase in usage during the off-peak hours. There was also a significant gain in the number of pedestrian and bicycle crossings: The 1982 results indicate a stabilizing effect in the public transportation sector and a decreasing rate of dependency on the private automobile.

Client: City of Boston
Services: Feasibility studies, area surveys, planning studies.

TAMS

BOSTON CENTRAL ARTERY

Boston, Massachusetts



The proposed reconstruction of Boston's Central Artery (1-93) raised questions concerning the current traffic patterns and future use of this major roadway. In order to collect the information needed to redesign 1-93, TAMS conducted one of the largest origin-destination studies ever undertaken, recording over 675,000 license plates on the Artery, its access and exit ramps, and major downtown arterials. License plate numbers were computer-matched to determine actual routes, and over 165,000 questionnaires were sent to drivers to obtain travel data.

The outcome of the study revealed that although through vehicles comprised only 15% of downtown Boston's traffic when the Artery was originally planned in 1945, that proportion had increased to almost 65% at the time of TAMS' survey in 1977. As a result, traffic congestion, particularly around the access and exit ramps, is a major problem. The survey data will be applied to determine the most efficient locations for the reconstruction of new ramps to alleviate the heavy traffic conditions in these areas.

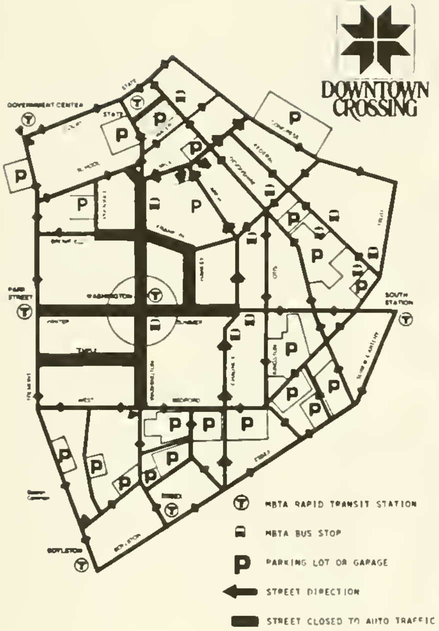
Operational deficiencies on the Artery and traffic circulation on local feeder streets were also assessed in this extensive traffic study.

Client: Massachusetts Department of Public Works

Services: Feasibility studies, area surveys, planning studies.

DOWNTOWN CROSSING

Boston, Massachusetts



TAMS was engaged for the implementation of a downtown Boston Auto-Restricted Zone (ARZ) program, including street reconstruction, traffic signals, bus routing and pedestrian amenity improvements. The project focused on the elimination of vehicular traffic from a number of central downtown streets. The transformation of this congested commercial area into a pedestrian mall and historic park was accomplished through major changes in traffic patterns.

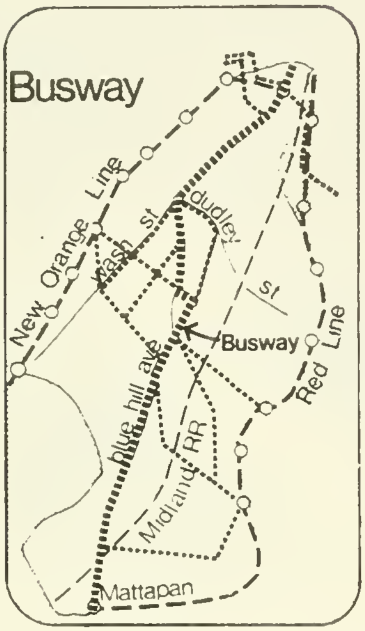
CLIENT: Massachusetts Bay Transportation Authority

SERVICES: Preliminary and final designs, traffic engineering, construction inspection services.

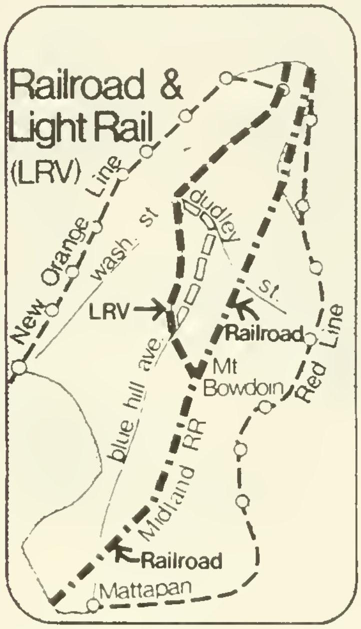
REPLACEMENT/TRANSIT IMPROVEMENT STUDY

Boston, Massachusetts

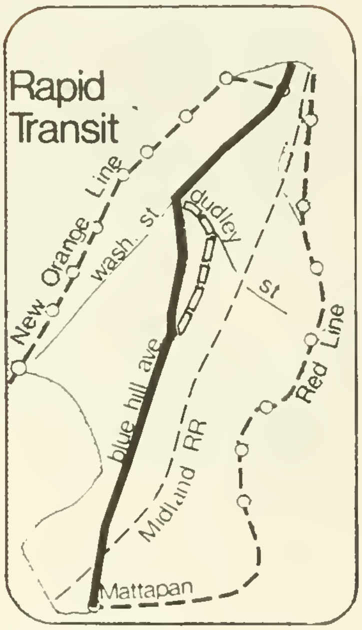
Washington-Warren-Blue Hill



Midland Railroad with Washington-Warren LRV to Mt. Bowdoin



Washington-Warren-Blue Hill



The thrust of this feasibility study and environmental impact analysis of transit alternatives in Boston's South End, Roxbury, Dorchester and Mattapan communities is to analyze the potential for industrial, commercial and residential strenghtening and redevelopment of this economically depressed corridor.

The first phase of the study examined a wide range of alternatives, from localized transit services to fixed-rail and busing options. Phase I recommendations included a number of light rail and bus lines. These will be studied further in Phase II of the project, which will result in the selection of the preferred alternative.

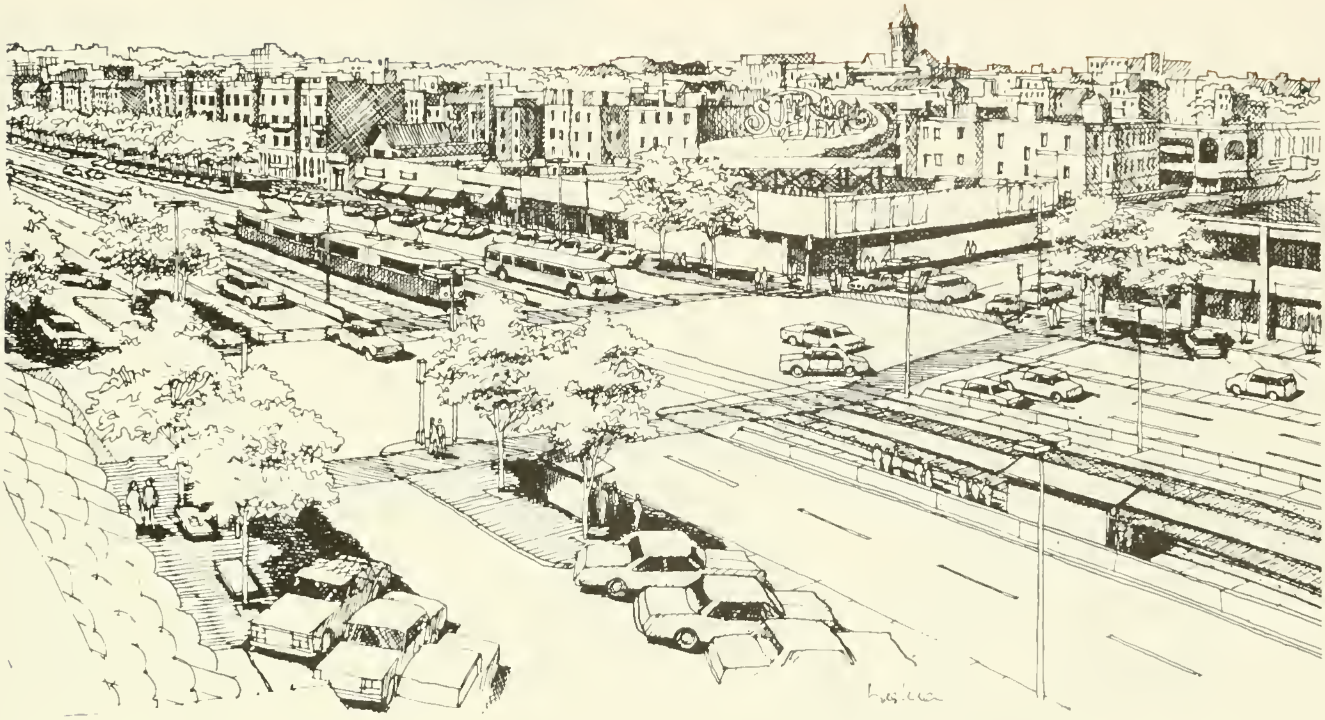
In addition, a continuous and extensive community participation process was developed to address the diverse needs and interests of the community. Input from these community meetings will be incorporated into the final recommendations for the project.

Client: Massachusetts Bay Transportation Authority (MBTA)

Services: Feasibility studies, environmental impact analysis, transit alternatives analysis.

COMMONWEALTH AVENUE

Boston, Massachusetts



Designs for Boston's Commonwealth Avenue aimed to provide for more efficient use of the right of way by automobiles and transit vehicles; to allow for safer and easier movements of pedestrians and to restore the Avenue's parkway-like appearance.

The project involved the reorganization of the roadway elements within the existing right of way into a four-lane main roadway — comprised of two lanes eastbound and two westbound — and two service roads running parallel to either side of this thoroughfare. The existing streetcar tracks were relocated from the north side of the main roadway to its center, thus forming a divider for the opposite traffic flows.

Benefits derived from this major reconstruction include improvements in:

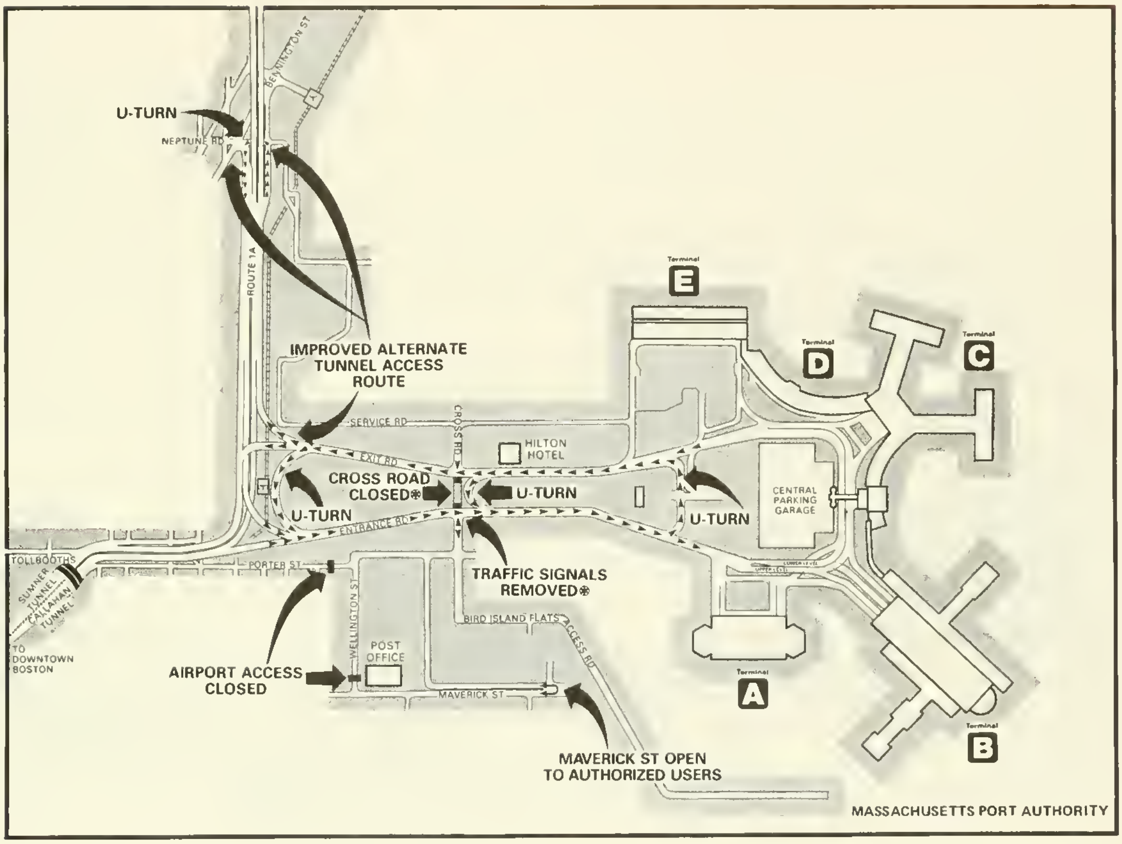
- Vehicular operation and safety by furnishing sheltered left-turn lanes to eliminate auto/street car conflicts.
- Transit operations and travel time by supplying a new track alignment and a street car priority system to minimize delays to the street car at signalized intersections.
- Pedestrian safety and comfort by allowing conflict-free pedestrian movements at signalized intersections, and by including amenities such as new brick sidewalk platforms, landscaping, pedestrian-oriented street lights, benches, and trash receptacles.

Client: Massachusetts Department of Public Works

Services: Plans; specifications and estimates; environmental impact analysis; public information/community input meetings

LOGAN AIRPORT TRAFFIC EXPERIMENT

Massachusetts



MASSACHUSETTS PORT AUTHORITY

TAMS was retained by Massport to assist in conducting a traffic management experiment with the objective of improving traffic flow conditions on airport roadways and reducing airport-related traffic in the adjacent East Boston community. The following elements were involved in the experiment:

- Elimination or control of access from local streets
- Elimination of two main access road traffic signals
- Diversion of outbound airport traffic during periods of traffic congestion at the tunnel
- Close monitoring of the experiment

The results of the experiment were very favorable, and most of the changes were made permanent. Experiment monitoring yielded the following results:

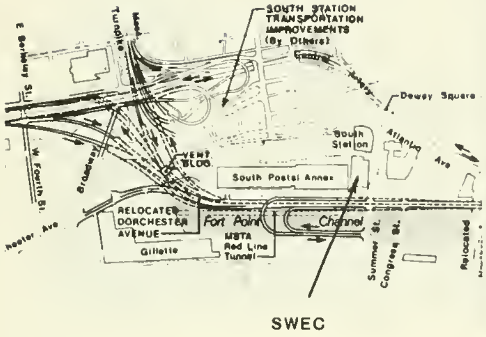
- The elimination of the traffic signals has resulted in travel time savings for most motorists.
- Vehicular speeds on airport roadways did not increase.
- There was a decrease in the total number of accidents and accident severity.
- There was a reduction in airport-related travel on local streets.

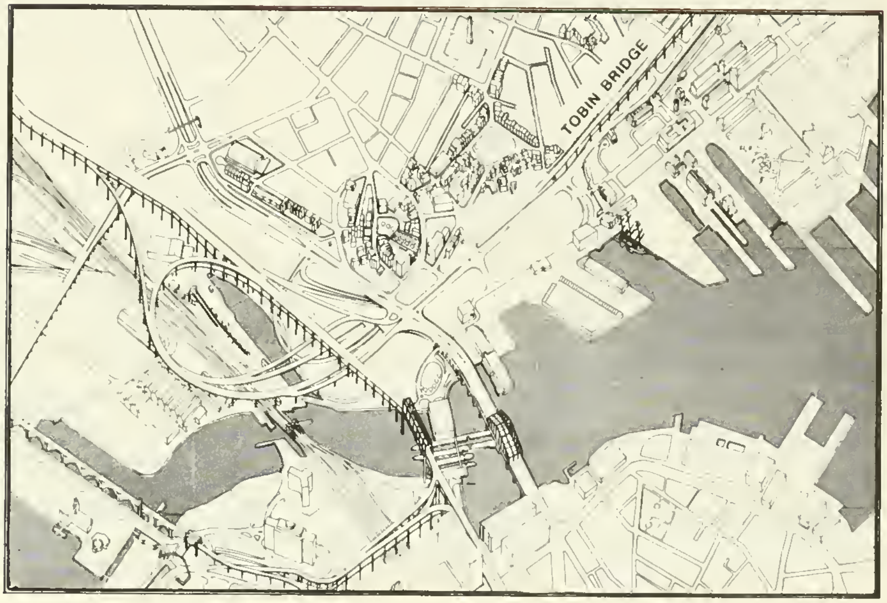
Client: Massachusetts Port Authority

Services: Feasibility studies; area surveys; planning studies

BOSTON CENTRAL ARTERY RECONSTRUCTION

Massachusetts





TAMS was retained by two clients to evaluate the traffic impacts of the proposed reconstruction of Boston's Central Artery (I-93).

In the North Area, at the junction of I-93 and Route 1, TAMS evaluated the proposed interchange design for Massport. Safety and capacity issues were addressed concerning the interchange's effect on the nearby Tobin Bridge, a Massport toll facility. The circulation impacts on the local streets were also evaluated, since Massport operates a number of docks and piers in the area.

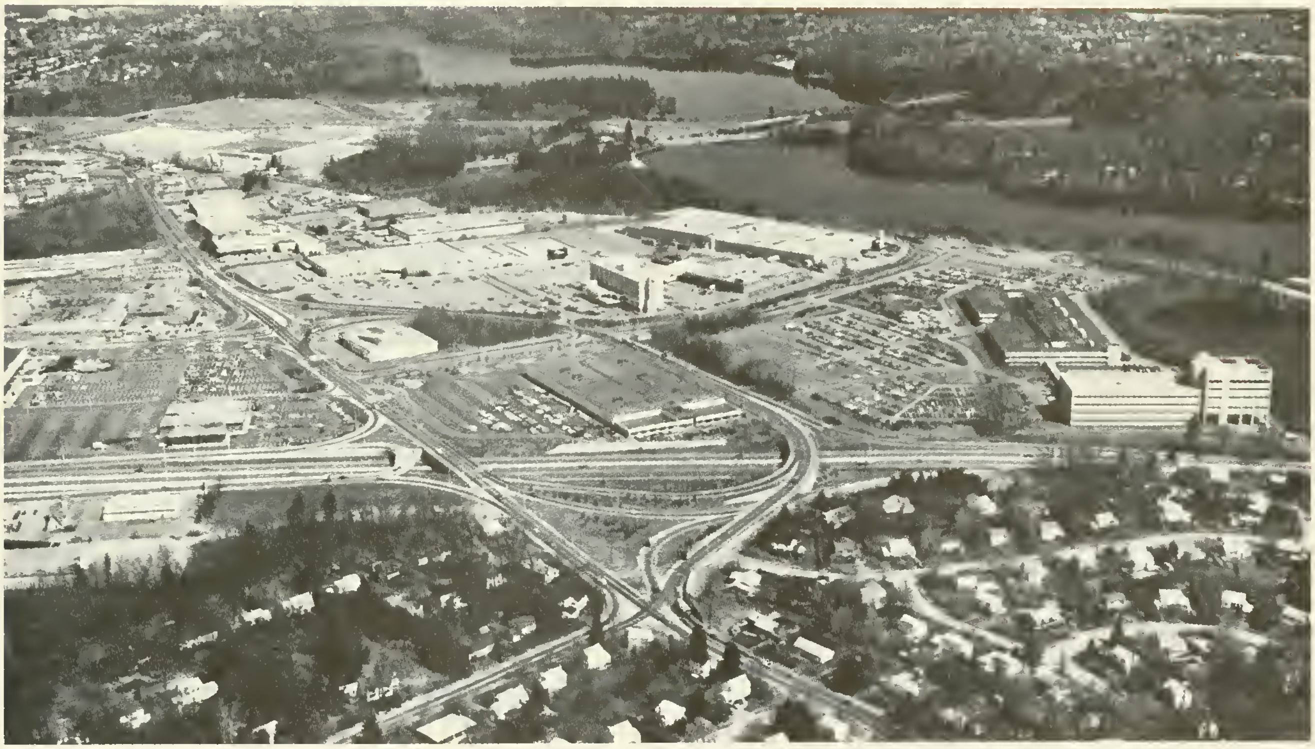
For Stone & Webster Engineering Corporation (SWEC), TAMS evaluated the impacts of the proposed interchange of I-93/Massachusetts Turnpike (I-90)/Third Harbor Tunnel on the SWEC facility. SWEC is the second largest employer in the city of Boston, and their world headquarters is located at the proposed interchange. TAMS' study showed that the traffic impacts on the SWEC facility could be significantly improved by modifying certain elements of the proposed interchange. Five alternatives were developed.

Client: Massachusetts Port Authority
Stone & Webster Engineering Corporation

Services: Feasibility studies; area surveys; traffic impact studies

SPEEN STREET INTERCHANGE

Massachusetts



TAMS prepared the Basic Design Report for the reconstruction of the two-mile length of Route 9 in Natick and Framingham, Massachusetts, an area that has experienced intensive commercial and industrial development in the past 20 years.

The project involved plans, specifications and estimates for the construction of a highway interchange at Route 9 and Speen Street in Natick, as well as for the recommended overall reconstruction scheme.

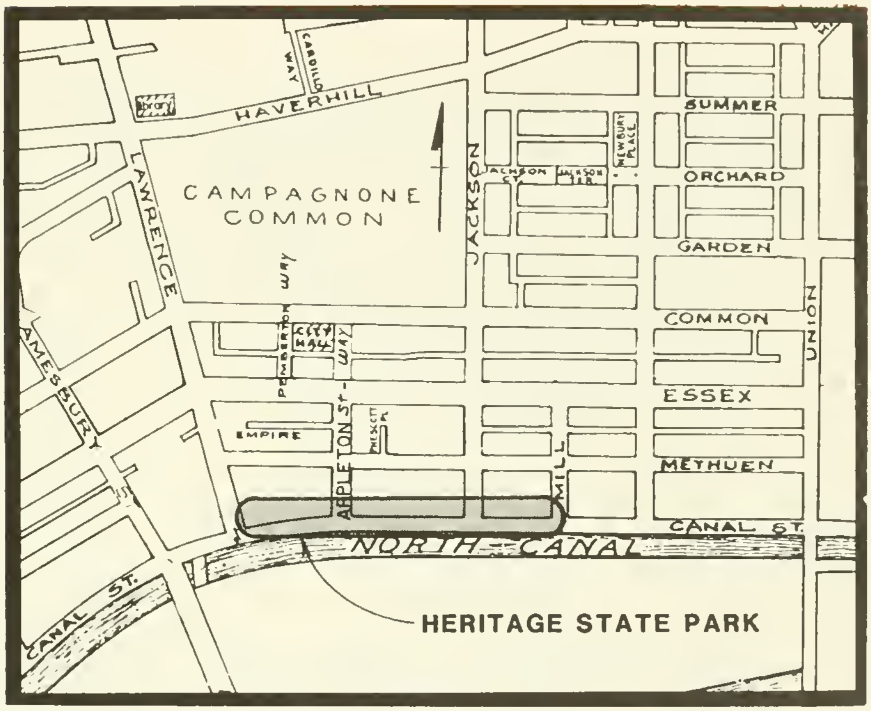
The interchange is a bi-lateral rotary where Speen Street is separated into northbound and southbound roadways. This arrangement minimizes property damage and accommodates turning and circulating movements which are consistent with traffic demand.

Client: Massachusetts Department of Public Works

Services: Feasibility studies, plan specifications and estimates, Environmental Impact Statement preparation.

HERITAGE STATE PARK TRAFFIC IMPACT STUDY

Massachusetts



TAMS was retained by the Department of Environmental Management to conduct a traffic impact study for the downtown area of Lawrence. The study involved the proposed closure of Canal Street which is scheduled to become part of the Heritage State Park. The park, which combines historic buildings, canals and factories with manicured commons and gardens, is expected to generate new industrial and residential growth. Both these developments were taken into consideration in the TAMS study.

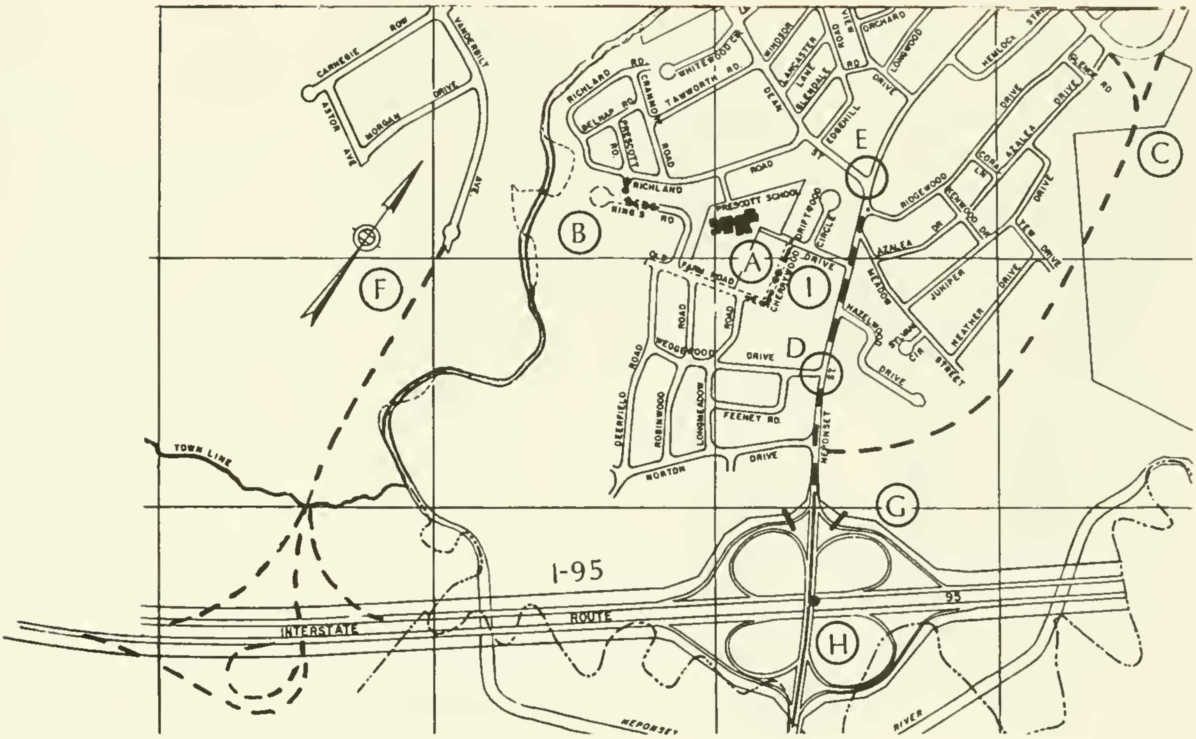
Traffic impacts were evaluated in terms of needed intersection and street improvements and the availability of Canal Street to serve through traffic. As a result of this investigation, TAMS found that with moderate industrial development, Canal Street could be closed off to through traffic. If maximum industrial development was to occur, however, it was determined that Canal Street would have to be opened to one-way traffic on weekdays.

Client: Commonwealth of Massachusetts
Department of Environmental Management

Services: Feasibility Studies
Area Surveys
Traffic Studies

NEPONSET STREET TRAFFIC STUDY

Massachusetts



The Town of Norwood retained TAMS to evaluate fourteen traffic alternatives in response to safety and capacity problems along Neponset Street. The two-lane roadway passes through a residential area and carries over 25,000 vehicles per day.

Both short- and long-term solutions were evaluated by TAMS. Possible alternatives investigated included the closure of the I-95 ramps during peak traffic hours and the construction of a new interchange.

Alternatives

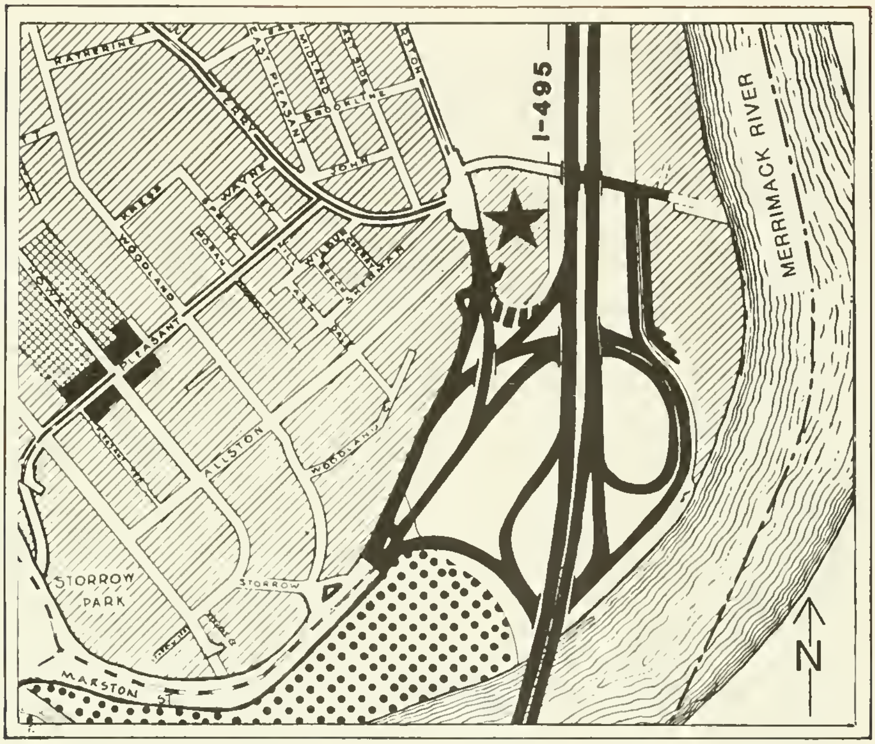
A	Cherrywood Connector
B	Richland Connector
C	Access Road
D	Signalization; Police Assistance
E	Signalization
F	Vanderbilt Connector
G	Closing of I-95 Ramps
H	Signalization of Interchange
I	Widening of Neponset Street
J — N	Combination of Alternatives

Client: Town of Norwood

Services: Feasibility Studies
Area Surveys
Traffic Studies

HOTEL COMPLEX
TRAFFIC IMPACT STUDY

Massachusetts



The city of Lawrence retained TAMS to evaluate the impacts of a major first class hotel and supporting facilities, including a restaurant, a lounge, a banquet hall, an indoor swimming pool and a health facility. TAMS was also asked to consider two additional developments when analyzing the traffic impacts on the adjacent interchange and intersections:

- Anticipated industrial growth within a half-mile radius of the site.
- Anticipated development in downtown Lawrence resulting from the construction of the Heritage State Park.

To improve access to the hotel site from the north on I-495, the impacts of modifying the southbound off-ramp were also analyzed.

Client: City of Lawrence

Services: Feasibility studies; area surveys; traffic impact studies

TRANSPORTATION STUDY FOR GENERAL ELECTRIC

Lynn, Massachusetts

General Electric retained TAMS to recommend solutions to the problems of access by truck and automobile to the company's Lynn Riverworks plant. Two heavily congested arterial roadways are the only routes to the plant for its 10,000 workers and the numerous commercial truckers who arrive there daily.

Since plans for a major freeway intended to serve GE had been cancelled, the company sought recommendations for internal operating changes to help alleviate these transportation deficiencies.

The firm prepared functional traffic designs and plans for improvements in internal procedures. Solutions were based on analyses of traffic data and the results of an employee survey. Changes judged to be most beneficial to improved employee access were recommended.

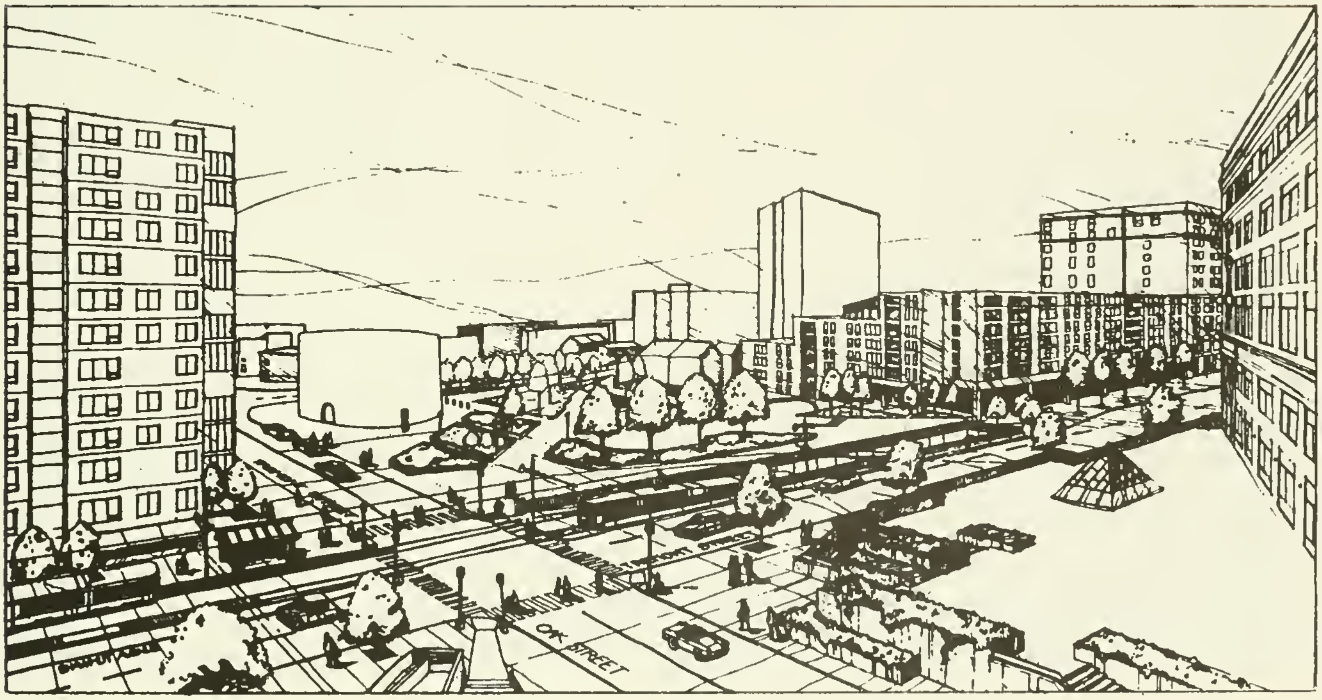
Client: General Electric Company — Lynn Riverworks

Services: Transportation impact analysis
Traffic engineering

TAMS

LIGHT RAIL STUDIES

MASSACHUSETTS



When the Massachusetts Bay Transportation Authority decided to replace an old elevated structure, Orange Line train service had to be relocated and a replacement transit service was needed for the residents of Boston's South End and Lower Roxbury neighborhoods. TAMS was requested by the MBTA to prepare an Alternatives Analysis/Draft Environmental Impact Statement for a suitable replacement service.

The analysis of various modes, including rapid transit and buses operating on an exclusive busway, indicated that light rail transit (LRT) or buses running on to city streets would provide the most cost effective replacement service.

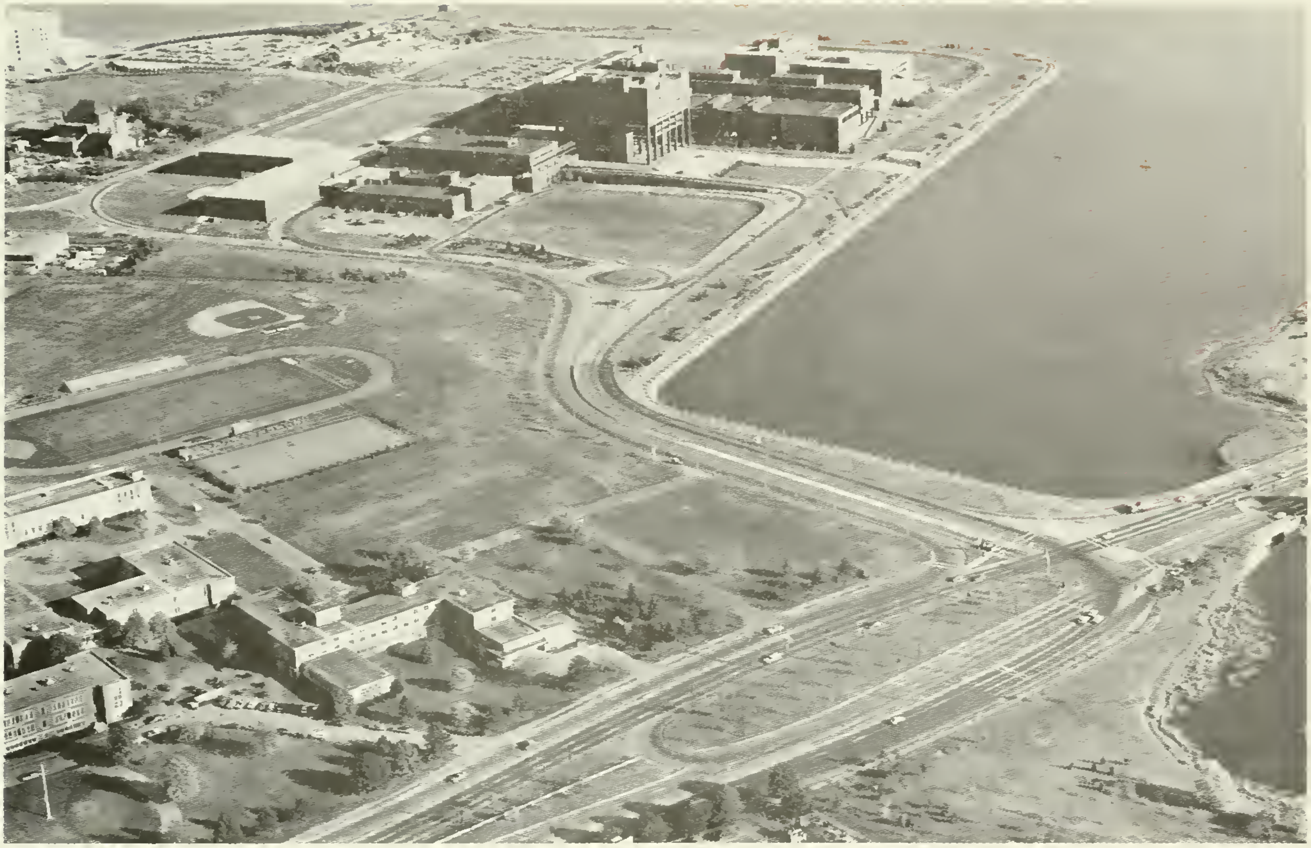
The analyses showed that an existing tunnel, abandoned in 1958, would provide a feasible route for LRT service into Boston's downtown area. Outside downtown, the LRT would run on the street on an exclusive reservation. TAMS prepared preliminary designs and cost estimates for both the LRT and bus options. The study also required an extensive citizen participation program, including meetings with more than 100 community groups.

Client: Massachusetts Bay Transportation Authority

Services: Alternatives Analyses/Draft Environmental Impact Statement; preliminary design; cost estimates; community participation

HARBOR CAMPUS ACCESS ROAD UNIVERSITY OF MASSACHUSETTS

Massachusetts



TAMS provided design services for the construction of an access road to the University of Massachusetts. Services included the construction of a service road to Boston College High School, reconstruction of the ramp between the Southeast Expressway and Columbia Road, a drainage system, retaining walls, rip-rap construction for shore protection, landscaping, major channelization, and signalization. A section of Morrissey Boulevard, Pulaski Circle and Old Colony Avenue was also reorganized and then reconstructed.

Client: Massachusetts Department of Public Works

Services: Design

H-26-85

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Staffing Plan

STAFFING PLAN

The following key staff will be assigned to this project.

Project Manager - Bruce Campbell, P.E.
Principal Investigator - Kenneth Petraglia, P.E.
Transportation Planning - Richard D. Tilles, P.E., AICP

Bruce Campbell has been practicing transportation engineering in the Boston area since the early 1950's. In the 1950's and 60's (Bruce Campbell & Associates), he designed numerous projects in the Boston area and has performed a variety of studies for a number of clients. He followed Boston's development through the BTPR (Boston Transportation Planning Review) as Massachusetts Commissioner of Public Works (1971-75). In the past year and a half alone, Bruce Campbell was deeply involved in an extracurricular manner in several activities important to Boston:

1. Service on Mayor Flynn's Transition Task Force (for Transportation).
2. Service on the Greater Boston Chamber of Commerce Advisory Committee on the Central Artery - Third Harbor Tunnel project, which resulted in unanimous support by the Chamber.
3. Served as President of the Massachusetts Highway Association, made up of 500 Highway and Public Works Directors throughout Massachusetts.

Certainly, the primary asset of TAMS' New England staff is the continuity and experience of its senior staff. Georgy Bezkorovainy, Gultekin Sultan and Dick Tilles have all been with TAMS in Boston for over 12 years. All five listed to this point are members of the Institute of Transportation Engineers (ITE). The Boston office has 8 ITE members available for assignment to this project. In-house architectural services will be performed by Chris Iwerks, R.A.

The following are brief descriptions of the key personnel to be used in the study. Full resumes are attached in the Appendix.

Bruce Campbell, Project Manager

Mr. Campbell has more than 30 years experience in traffic engineering and transportation planning. For many years, he directed the highway safety programs of the Massachusetts Safety Council. In his own engineering firm, he provided traffic engineering design for many New England cities and towns. He was the Commissioner of Public Works for Massachusetts (1971-75). He has prepared several studies on Priority Programming for the Transportation Research Board and various states, cities and towns, and is currently conducting a national study for TRB on methods of cost effectiveness for highway projects.

Kenneth Petraglia, Principal Investigator

Mr. Petraglia has had a variety of experience in the field of transportation engineering with TAMS. He recently had a major responsibility in user surveys for the Alaska International Airport study, the 1982 Downtown Boston Cordon Count and the Southeastern Alaska Transportation User survey. His other major assignments with TAMS included parking and traffic studies in Malden, Massachusetts and traffic analysis for the Springfield Bypass in Virginia, Logan International Airport Ground Access Studies, and the Feasibility Study of the 1992 Chicago World's Fair.

Richard D. Tilles, Community Coordination

Mr. Tilles is both a registered engineer and certified city planner. With TAMS for 16 years, he has headed planning studies from the Boston office in Alaska, Chile, Iran, Delaware, Virginia, etc. Locally, he is currently directing the replacement transit study in Boston's Southwest Corridor which involves interaction with a dozen different community groups, as well as Boston and MBTA officials. He also was in charge of a Master Transportation Plan for the congested Framingham/Natick area. He is directing the firm's efforts for the City of Hartford (CT) for the final redesign of Interstate 84 and Interstate 91. He has coordinated community involvement for several major Environmental Impact Statements and is directing transportation studies of the 1992 Chicago World's Fair.

Georgy Bezkorovainy, Traffic Engineering

Mr. Bezkorovainy is a Senior Transportation Engineer with a wide variety of experience with TAMS. He was the Project Manager of the recently-completed Logan Airport Traffic Experiment. He also had a major role in Boston's Cordon Count, the Origin & Destination Study of Boston's Central Artery, a traffic impact study for a synthesis gas demonstration plant in Henderson County, Kentucky, the I-84/I-91 interchange in Hartford, CT, the Elizabeth River viaduct in New Jersey, and a transportation study for General Electric in Lynn, Massachusetts.

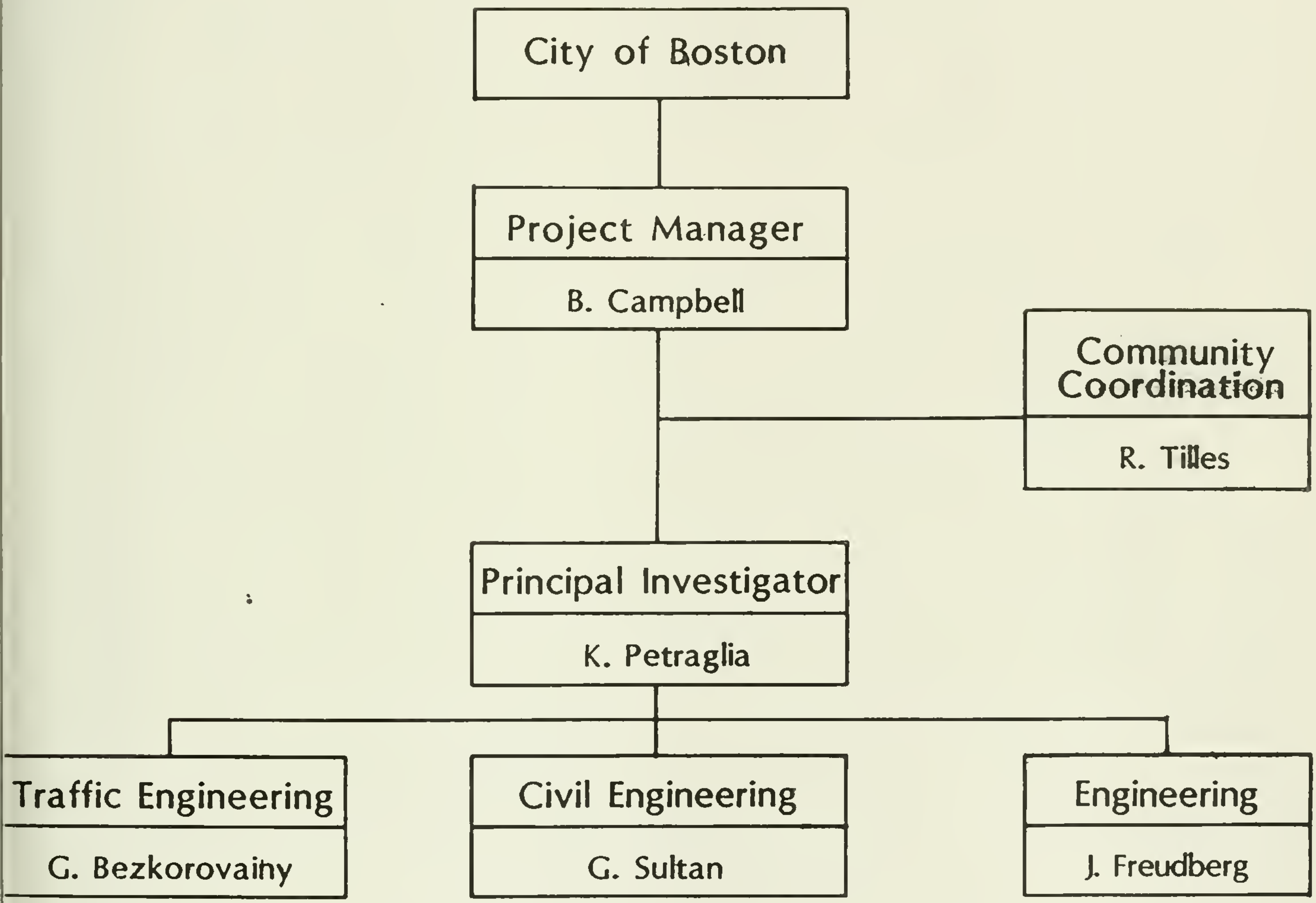
Gultekin Sultan, Alternatives & Civil Engineering

Mr. Sultan is a Project Manager and since 1970 has been responsible for the design of more than thirty traffic and transportation engineering projects in Massachusetts for TAMS, including TOPICS and Urban Systems work. He was in charge of the engineering design of Boston's Downtown Crossing; the computerized traffic control systems for Boston and Malden; the reconstruction of Commonwealth Avenue in Boston and Route 28 in Stoneham and construction staging for Dulles Airport access road in Virginia. He also played a major role in recent traffic improvements at Logan International Airport and the Replacement Transit Study for Boston's Southwest Corridor.

Jeffery G. Freudberg, Civil Engineering

Mr. Freudberg has developed conceptual geometric and traffic design including capacity and parking analyses, traffic circulation and signal systems as well as sign design on a variety of projects in Massachusetts and Connecticut. He has also been involved in Urban Systems Safety Improvement projects in Massachusetts including Commonwealth Avenue in Boston, Route 28 in Stoneham, and several locations in Newton and Tewksbury, and the Boston Central Artery Origin & Destination Study, and Logan International Airport Ground Access Studies.

Project Organization



Fee Proposal

FEE PROPOSAL

The City of Boston has authorized a expenditure not exceeding $20,000 for the conduct of a comprehensive transportation study of the Back Bay. If the consultant were to collect all data and to perform all required analyses, we estimate that a meaningful study would cost upwards of $40,000. In order to keep the scope of work within the prescribed limits, we assumed that a portion of the needed work effort would be performed by the City or others. The following is the level of effort we anticipate to expend for the Back Bay Study. At the conclusion of the fee estimate is a summary of work elements that is not included in our Scope of Work.

Estimated Person-Hours

Task	Project Manager	Principal Investigator	Senior Engineer	Engineer	Drafter/ Technican
I A 1	-	1	-	-	-
2	1	12	2	15	20
B 1	1	8	2	8	15
2	-	5	1	5	8
C	1	5	-	18	20
D 1	1	5	1	12	35
2	-	2	-	2	2
E	-	2	-	2	15
F 1	-	2	-	5	10
2	1	3	-	-	-
3	-	3	-	2	-
G	1	4	-	-	2
H	1	3	-	-	2
J	-	3	5	1	10
K	1	5	-	5	3
L	1	5	-	5	3
M	2	12	1	-	2
Sub Total	11	80	12	80	147

Task	Project Manager	Principal Investigation	Senior Engineer	Engineer	Drafter/ Technican
II A 1	1	5	3	2	5
2	1	5	1	2	3
3	1	5	1	2	3
4	1	8	2	5	10
B	1	3	2	3	8
C	1	3	3	3	8
D	1	3	2	3	8
E	1	20	1	-	2
Sub Total	8	52	15	20	47
III A 1	1	2	1	-	5
2	1	1	1	-	2
B	1	2	1	-	1
Sub Total	3	5	3	-	8
TOTAL	22	137	30	100	202

Project Manager	22 hours @ $35/hr. =	770
Principal Investigator	137 hours @ $19/hr. =	2,603
Senior Engineer	30 hours @ $22/hr. =	660
Engineer	100 hours @ $16/hr. =	1,600
Drafter/Technician	202 hours @ $10/hr. =	2,020
		7,653
Multiplier for Overhead & Fee		2.5
Out of Pocket costs		19,133
(computer, printing, reproduction & travel)		900
	SAY $	20,000

The following work elements are to be supplied by the City or others:

Task	Description
I A 1	Collection of 24-hour machine counts and manual turning movement counts
B 1	Level of Service analysis for intersections
B 2	Supply traffic signal timing plans and time-space diagram
D 1	Supply land use maps showing existing traffic generation

Task	Description
D 2	Collection of traffic counts at principal driveways and access points.
E	Supply accident data for a 3-year period. Summarize data for a 2-year period
J	Calculate air quality at intersections 11 through 50.
III A 1	Supply land use information for proposd development. Perform quantitative traffic impacts analysis for existing street pattern.
A 2	Perform quantative traffic impact analysis for changes proposed in Task II

No Working Committee meetings are assumed for Task III. In total we are budgeting for seven Working Committee meetings and one public meeting.

Appendix

Resumes

BRUCE CAMPBELL

Education

Massachusetts Institute of Technology, B.S., Civil Engineering, 1949
Massachusetts Institute of Technology, M.S., Civil Engineering, 1953

Registration

P.E. – Massachusetts

Technical Societies

American Society of Civil Engineers
Boston Society of Civil Engineers Chapter/ASCE
Institute of Transportation Engineers
American Public Works Association
Transportation Research Board

Professional History

1983 - date

New England Regional Manager – Tippetts-Abbett-McCarthy-Stratton (TAMS). Responsible for technical and administrative operation of office engaged in transportation planning, traffic engineering, design of transportation facilities, and architecture.

1982 - 1983

Senior Vice President – Vanasse/Hangen Associates, Boston. Responsible for coordination of marketing. Also directed impact studies of expansion and relocation of several major industries, as well as projects involving priority programming and pavement management systems.

1975 - 1982

Vice President – Fay, Spofford & Thorndike, Inc., Boston. Director of Marketing. Also participated in major projects involving alternatives analysis studies for rail transit, environmental impact statement for a $5 billion steel plant, a Six-Year State Highway Priority Program, impact study for a major Theme Park, major highway and urban systems projects.

1971 - 1975

Commissioner – Massachusetts Department of Public Works, Boston, Massachusetts. Responsible for constructing and maintaining highways, waterways and dams and directed the state's solid waste disposal program. In charge of a staff of 4,700 and a budget of $250 million. Directed a major reorganization aimed at making the Department more responsive to multi-modal transportation planning and development. Established the Bureaus of Project Development, Environmental Surveys and Traffic Engineering, and established the statewide Citizen's Participation Program. Supervised statewide Airport System and Railroad System master plans.

Established Priority Programming/Management Information System. Responsible for establishing I-190, Worcester County, and Third Harbor Crossing on the Interstate System; extension of I-290 and I-495 to Route 85; extension of I-495 and many other projects.

1953 - 1971

Partner – Bruce Campbell & Associates, Boston, Massachusetts. In charge of traffic engineering and parking projects in New England and elsewhere. Conducted studies leading to the TOPICS/Urban Systems programs in Burlington, Vermont; Berlin and Nashua, New Hampshire; Rockland and Sanford, Maine; Chelsea, Everett, Lynn, Marblehead, Peabody, Pittsfield, Revere, Shrewsbury and Watertown, Massachusetts; and Woonsocket, Rhode Island. Retained by commercial, industrial and real estate developers, shopping centers, oil companies, institutions, etc., for development and environmental impact studies to select new sites or enlarge facilities on existing sites.

1951 - 1969

Executive Vice President – Massachusetts Safety Council, Boston, Massachusetts. Initiated adoption of many national standards for highway safety through engineering, education and enforcement reforms. Directed occupational safety programs for 300 major industries.

1949 - 1951

Highway Engineer – Fay, Spofford & Thorndike, Inc., Boston. Highway design and geometric layout calculations for Boston's elevated Central Artery highway.

KENNETH J. PETRAGLIA

Education

Northeastern University, B.S.C.E., 1973
Northeastern University, M.S. in Transportation, 1977

Registration

Professional Engineer, Massachusetts

Technical Societies

Member, American Society of Civil Engineers
Associate Member, Institute of Transportation Engineers

Publications

Author – "A Simulation Model to Develop Optimum Procedures for Manual Traffic Control at Intersections," Northeastern University Library, June 1977.

Professional History

1984 - date

Senior Transportation Engineer – Tippetts-Abbett-McCarthy-Stratton (TAMS). Responsible for an evaluation of impacts to the Town of Belmont, Massachusetts due to extension of the MBTA's Red Line. Analysis of traffic operations and development impacts in downtown Malden, Massachusetts.

1983 - 1984

Project Manager – Vanasse/Hangen Associates. Responsible for the transportation elements of Environmental Impact Reports for a "Waste-to-Energy" incinerator, the St. James and the Parcel 7 Developments, all in Boston, and a Commerce Center in Canton, Massachusetts. In charge of corridor studies of Burlington Mall Road in Burlington and Andover Street in Lawrence, Massachusetts. Prepared an access road feasibility study for a development in Milford, Massachusetts. Traffic impact studies in numerous communities throughout Massachusetts and New Hampshire.

1978 - 1983

Project Manager – (TAMS). Responsible for the Maplewood Square Parking and Traffic Study and a CBD Traffic Impact Study in Malden, Massachusetts.

Project Engineer – (TAMS). In charge of private transportation elements for the 1982 Downtown Boston Cordon Count and summary of data using the SAS computer software package.

Responsible for logistics and field operations for the Southeastern Alaska Transportation User Survey encompassing airports, ferry terminals and highway border stations in Anchorage, Seattle and throughout Southeastern Alaska. Created and documented RAMIS II reporting programs.

Responsible for final plans, specifications and estimate for roadway reconstruction and a traffic signal system in Waltham, Massachusetts. Development of design concepts at the West End Intersection, Gloucester, Massachusetts.

Transportation Engineer – (TAMS). Responsible for traffic engineering and user surveys for the Anchorage International Airport Surface Transportation Study. In charge of trolley bus feasibility and right-of-way analysis for the MBTA Orange Line Replacement Transit Study in Boston. Preliminary highway design and estimates for alternative access routes to a synthesis gas plant in Baskett, Kentucky. Supervision of a comprehensive survey of Long Island Rail Road passengers, New York.

Responsible for a survey of all modes of transportation servicing Skagway, Alaska and the surrounding area for presentation in an environmental impact statement for a proposed Bulk Oil Petroleum Terminal.

Data evaluation and analysis, including traffic reassignment, turning movement development, capacity analysis and traffic signal design for an environmental impact study for 30 miles of highway in Fairfax County, Virginia and for the new community of Jubail, Saudi Arabia.

1977

Instructor – Northeastern University. Taught course in Strength of Materials.

1976 - 1977

Transportation Engineer – Alan M. Voorhees Associates, Inc. Prepared quantity and cost estimates for various TOPICS locations

1973 - 1974

Traffic Engineer – E.L. Pavlo Engineering. Design of traffic signals and layouts for TOPICS areas.

RICHARD D. TILLES

Education

Cornell University, B.C.E., 1963
Columbia University, M.S. in Urban Planning, 1965

Registration

P.E. – New York, Massachusetts, Rhode Island
American Institute of Certified Planners

Technical Societies

Member, American Planning Association
Member, American Society of Civil Engineers
Member, Institute of Transportation Engineers

Publications

"Airport Traffic Generation Model," ASCE Conference on Computing in Civil Engineering, June, 1978.
"Curb Space at Airport Terminals," *Traffic Quarterly*, October, 1973;
Co-author – "Simulation of Interface Systems at Airports," Southeastern IEEE Conference, 1972.
Co-author – "Automating the Delivery of Ground Transportation Information." TRB Annual Meeting, 1981.

Professional History

1968 - date

Project Manager – Tippetts-Abbett-McCarthy-Stratton (TAMS). Independent feasibility study for 1992 Chicago World's Fair. Review of Interstate Construction for City of Hartford. Transportation User Survey of Southeastern Alaska. In charge of forecasting for master plan of international airport in Santiago, Chile. Manager of surface transportation study for Anchorage International Airport. Planning for transit station expansion in Malden, Mass.

Project Manager for an alternatives analysis and environmental impact study of public transportation in South End, Roxbury, Dorchester and Mattapan communities in Boston. In charge of transportation aspects of an E.I.S. for 30 miles of highway in Fairfax County, Virginia. Manager of a study of ground access at airports throughout the U.S. Manager of feasiblity study to develop automated ground transportation information systems at Boston's Logan and Washington D.C.'s National and Dulles Airports.

In charge of ground access study for the Aryamehr International Airport, Tehran, Iran. Responsible for traffic forecasts, land use study and environmental analysis of proposed ferry crossing in Anchorage, Alaska. Responsible for Master Transportation and Land Use Planning Study in Framingham and Natick, Massachusetts.

Transportation Planner – TAMS. Analysis of transit needs in Harrisburg, Pennsylvania, including conduct of an on-board survey of bus users; study of air quality and noise for highway corridors in the Harrisburg metropolitan area; preparation of transportation plans for proposed new town of Pontchartrain in New Orleans, Louisiana; planning of a proposed multi-modal terminal in Harrisburg, Pennsylvania; computer simulation of aircraft movements, passenger movements and vehicle movements at Maiquetia International Airport in Caracas, Venezuela; preparation of a master plan and site development plans for Battery Park City in Manhattan; preparation of forecasts and financial analysis for master plan of the Greater Wilmington Airport, Delaware. In charge of ground access and passenger simulation studies for Greater Pittsburgh Airport.

1966 - 1968

Captain – U.S. Army Corps of Engineers. Operations officer and commander of a construction company in Thailand. Instructor at the United States Army Engineer School at Fort Belvoir, Virginia.

1965 - 1966

Senior Urban Planner – New York State Department of Public Works, Albany, New York. Preparation of transportation plans for the Capitol District and Utica-Rome areas.

1/85

GEORGY BEZKOROVAINY

Education

University of Illinois, B.S.C.E., 1962; M.S.C.E., 1964

Registration

P.E. – California

Technical Societies

Member, Institute of Transportation Engineers

Publications

Author –"Hazard Index Formula for Railroad Crossing Protection for Lincoln, Nebraska," *Traffic Engineering*, December, 1967; "Evaluation of Traffic Engineering Short Courses," *Traffic Engineering*, April, 1973. "Accident Rates on the Secondary Road System in Iowa," *Better Roads*, April, 1973. Co-author – "Effect of Advisory Speed Limits on Horizontal Curves of Two-Lane Rural Highways," *Traffic Engineering*, September, 1966; " The Use of Stop Signs at Railroad Crossings," *Traffic Engineering*, November, 1966;" A Comparison of Regional Airport Sites in Northeast Ohio," Center for Urban Regionalism, Kent State University, April, 1970.

Professional History

1973 - date

Project Manager – Tippetts-Abbett-McCarthy-Stratton (TAMS). Traffic signal design for a number of Massachusetts communities; Logan International Airport traffic management experiment; analysis of traffic impacts of the Synthesis Gas Demonstration Plant, Baskett, Kentucky. Transportation improvements study, G.E. Company, Lynn, Mass.; systemwide M.B.T.A. bus stop sign fabrication and installation program in Massachusetts; CBD traffic impact studies in Princeton, N.J. and Lawrence, Mass.; traffic impact analysis for over 25 clients in Massachusetts.

Project Engineer – TAMS. Responsible for the design of signs and pavement markings for the Jubail Community highways in Saudi Arabia. Responsible for traffic analysis for the I-88/I-81 connector in Broom County, New York and the Anchorage International Airport in Anchorage, Alaska. Final design of Boston's Downtown Crossing and New York City's Broadway Plaza auto-free zones and of numerous roadway reconstruction projects in Massachusetts; review of contract plans and specifications for traffic signals and Urban Systems Projects; monitoring, field inspection and preparation of final inspection reports for computerized traffic signals systems; traffic signal design for the Nepperhan Arterial, Yonkers, N.Y.; Lincoln Memorial Circle traffic study, Washington, D.C.; field surveys and deficiency analysis for Central Artery origin-destination study and the 1982 Boston Cordon Count, Boston, Mass.; preparation of Functional Design Reports and Areawide TOPICS plans in numerous cities and towns in Massachusetts.

1970 - 1973

Traffic Research Engineer – Transportation Safety Research Center, University of Iowa, Oakdale, Iowa. Responsible for administering and teaching a statewide traffic engineering education program for state, county and city officials, including recruiting of speakers and lectures for short courses, workshops and conferences. Conducted traffic engineering research for the Center.

1967 - 1970

Traffic Engineer – Parking and Traffic Department, Kent State University, Kent, Ohio. Responsible for directing traffic engineering activities on the University campus. Assisted in operation of university-owned bus transit system. Project Coordinator for a feasibility study of a regional airport in northeast Ohio.

1964 - 1967

Traffic Engineer – Traffic Engineering Department, City of Lincoln, Nebraska. Conducted traffic and parking studies, accident analyses and programming traffic improvements.

1962 - 1964

Research Associate – Civil Engineering Department, University of Illinois, Urbana, Illinois. Conducted research relative to automobile speeds in central Illinois.

GULTEKIN SULTAN

Education

Welsh College of Advanced Technology, United Kingdom, Higher National Diploma (Structural Engineering), 1959

Royal Technical College, Salford, United Kingdom, Certificate in Advanced Theory of Structures, 1960

Middle East Technical University, Ankara, Turkey, Master's Degree in City Planning (MCP), 1968

University of Southampton, United Kingdom, M.S. in Transportation Planning and Engineering, 1970

Registration

P.E. – Massachusetts, Rhode Island

Technical Societies

Member, American Society of Civil Engineers
Member, Institute of Transportation Engineers
Member, Institute of Highway Engineers, United Kingdom
Associate Member, Institute of Structural Engineers, United Kingdom

Publications

Co-author, "The Development of Boston's Computerized Traffic Control System", *Traffic Engineering*, April 1975

Professional History

1970 - date

Project Manager – Tippetts-Abbett-McCarthy-Stratton. Responsible for preparation of contract plans, specifications and estimates for more than thirty transportation engineering projects in Massachusetts. In charge of design for Auto Restricted Zone (Downtown Crossing), Boston, and Computerized Traffic Control Systems for Boston and Malden. Reconstruction of Commonwealth Avenue, Boston and Route 28, Stoneham. Construction staging for Dulles Airport access highway in Virginia. Responsible for the final design of projects covering signalization, trolley priority and bus pre-emption systems, roadway construction, drainage and utility improvements, channelization and street lighting; planning and preparation of conceptual design reports and urban circulation systems for TOPICS and Urban Systems projects; coordination of engineering designs with Federal, State and municipal agencies; and preparation of budget estimates, work schedules and environmental impact assessments.

1961 - 1969

Program Development Supervisor – The Tumpane Co., Inc., Ankara, Turkey. In charge of Program Development Section. Responsible for developing, justifying and monitoring the execution of the U.S. Air Force Base Civil Engineers Annual and Long Range work plans and operations of Maintenance Program. Preparation and coordination of Military Construction Program and the development of Base Master Plan. Preparation of engineering reports including economic and engineering evaluations. Final acceptance inspections for military facilities. (1966 - 1969)

Projects and Plans Engineer – The Tumpane Co., Inc., Sinop, Turkey. In charge of the Engineering Section. Responsible for the supervision and administration of all engineering activities in connection with the preparation of plans, specifications and estimates for military projects. These include civil engineering work in connection with roads, reinforced concrete and steel structures, water, sewage and drainage systems. Preparation of the military Construction Program, engineering reports and feasibility studies. 1964 - 1966

Structural Engineer – The Tumpane Co., Inc., U.S. Air Force Base, Adana, Turkey. Preparation of contract plans, specifications and estimates for airport runway concrete pads, steel and reinforced concrete buildings, steel bridge for fuel line canal crossings, and other military structures. Inspection of projects under construction. Directing layouts of sites and foundations and coordination of construction activities. Preparation of engineering reports and feasibility studies. 1961 - 1964

1959 - 1961

Civil Engineer, Inspector and Surveyor. Design, construction inspection and field surveying for various civil engineering projects.

JEFFREY G. FREUDBERG

Education

Brown University, B.S.C.E. 1978
Massachusetts Institute of Technology, Graduate Courses in Transportation, 1978 - 1979
Northeastern University, Graduate Courses in Transportation, 1983

Registration

E.I.T. — Rhode Island

Technical Societies

Associate Member, Institute of Transportation Engineers
Associate Member, Transportation Research Board
Associate Member, Sigma XI

Professional History

1983 - date
1978 - 1980

Transportation Engineer — Tippetts-Abbett-McCarthy-Stratton, Boston. Assisted in the design and planning of a variety of highway, transit, and airport-related projects. Prepared contract plans, cost estimates and alternative construction staging strategies for Urban Systems Safety Improvement projects including Commonwealth Avenue in Boston, Route 28 in Stoneham, Speen Street/Route 9 in Natick and other locations in Newton and Tewksbury, Mass. Prepared analysis of project benefits for a prefeasibility study for an Airport Ground Transportation Information System. Performed field survey and assisted in writing preliminary report for Bus Priority Projects, Boston area. Edited report and technical addenda for Boston Central Artery Origin-Destination Study.

1980 - 1983

Transportation Engineer — Storch Engineers, Boston. Prepared contract plans, specifications, and estimates for urban arterial and major highway projects in Massachusetts and Connecticut specializing in traffic circulation, traffic signal systems, and sign design. Developed conceptual traffic and geometric designs for five and one half miles of Commonwealth Avenue in Newton, Mass., downtown commercial areas in Gardner, Pepperell, and Dorchester, Mass., and intersections in Framingham, Ashland, Wakefield, and Winchester, Mass. and Stamford, Conn. Included were complete traffic safety, capacity, and parking analyses, preparation of design reports and public presentations, and development of major circulation changes, signal system strategies, parking lot arrangements, and sidewalk and plaza designs. Prepared traffic impact reports for land developments in Massachusetts and Connecticut including office, apartment, condominium, retail, and fast-food restaurants.

1977

Engineering Aide (Summer) — Massachusetts Institute of Technology, Cambridge. Assisted graduate students and professors in the Water Resources Laboratory with their research projects. Performed computer programming, drafting, library research, lab work.

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